



PATENT APPLICATION

PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Kenji SAMOTO

Application No.: 10/669,687

Filed: September 25, 2003

For: FLEXIBLE CABLE HARNESS AND IMAGE FORMING APPARATUS

On Appeal from Group: 2174

Examiner: J. LEE

Docket No.: 117213

APPEAL BRIEF TRANSMITTAL

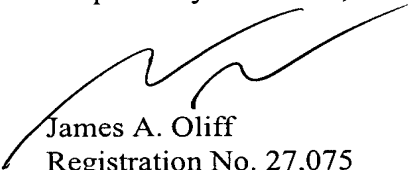
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BRIEF ON APPEAL

Appeal from Group 2174

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is Brother Kogyo Kabushiki Kaisha, by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 014542, Frame 0631.

II. STATEMENT OF RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellant, Appellant's representative, or the Assignee, that may be related to, or which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-15, 19 and 20 are on appeal.

Claims 1-15, 19 and 20 are pending.

No claims are allowed.

Claims 1-8, 19 and 20 are rejected.

Claims 9-15 are withdrawn from consideration.

Claims 16-18 have been canceled.

IV. STATUS OF AMENDMENTS

A Request for Reconsideration was filed on December 28, 2006 in reply to the Final Rejection dated August 28, 2006. The Request for Reconsideration was considered by the Examiner as evidenced by the Advisory Action dated February 6, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claims relate to a flexible cable harness with a plurality of flexible cables that transmit electrical signals from a main body to a carriage in an image forming apparatus. The flexible cable harness is structured such that the flexible cables located more inward at a curve have a shorter distance from a first end to a second end in order to prevent breakage or damage to the cables caused by deflection at a curved area. A first positioning system and a second positioning are added near a first and a second end, respectively, in order to set the cables in place without the need for measuring the distance between the first positioning system and the second positioning system, which varies according to each cable.

According to one exemplary aspect of the invention, a flexible cable harness (flexible cable harness 109) according to claim 1 includes:

a plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn), each having a first end (left end, Fig. 3) connected to a first object (connector 101 provided in the control part 100) and a second end (right end, Fig. 3) connected to a second object (connector 103 of the recording head 15), at least one of the plurality of flexible cables contributing to an electrical connection between the first object (connector 101 provided in the control part 100) and the second object (connector 103 of the recording head 15), (Figs. 2A-5 and paragraphs [0027] and [0032], for example)

each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) comprising:

a curved portion (at curve A, Fig. 2) that curves between the first end (left end, Fig. 3) and the second end (right end, Fig. 3);

a first positioning system (first positioning system 107) added (for example, by bonding tab-shaped sheets 107a to bonded surfaces 107b at one end of a cable

using adhesive or double-faced tape, paragraph [0035]) near the first end (left end, Fig. 3) in the curved portion; and

a second positioning system (second positioning system 108) added (for example, by bonding tab-shaped sheets 108a to bonded surfaces 108b at one end of a cable using adhesive or double-faced tape, paragraph [0035]) near the second end (right end, Fig. 3) in the curved portion, wherein a distance from the first positioning system (first positioning system 107) to the second positioning system (second positioning system 108) is different in each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn as illustrated at the left end of Fig. 3) such that more inward flexible cables located at the curved portion (at curve A, Fig. 2) are shorter in distance between the first positioning system (first positioning system 107) and the second positioning system (second positioning system 108) (Fig. 3 and paragraphs [0030], [0031] and [0039]), the first positioning system (first positioning system 107) of each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) is fixed to a first positioning part (first positioning part 105) provided on or near the first object (connector 101 provided in the control part 100) (Fig. 4), the second positioning system (second positioning system 108) of each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) is fixed to a second positioning part (second positioning part 106) provided on or near the second object (connector 103 of the recording head 15) (Fig. 5), and each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) are spaced in the curved portion (at curve A, Fig. 2). See also paragraphs [0035]-[0038] and [0047]-[0052] for advantages thereof.

According to another exemplary aspect of the invention, a flexible cable harness (flexible cable harness 109) according to claim 19 includes:

a plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn), each having a first end (left end, Fig. 3) connected to a first object (connector 101

provided in the control part 100) and a second end (right end, Fig. 3) connected to a moveable second object (connector 103 of the recording head 15), at least one of the plurality of flexible cables contributing to an electrical connection between the first object (connector 101 provided in the control part 100) and the second object (connector 103 of the recording head 15), (Figs. 2A-5 and paragraphs [0027] and [0032], for example)

each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) comprising:

a curved portion (at curve A, Fig. 2) that curves between the first end (left end, Fig. 3) and the second end (right end, Fig. 3);

a first positioning system (first positioning system 107) added (for example, by bonding tab-shaped sheets 107a to bonded surfaces 107b at one end of a cable using adhesive or double-faced tape, paragraph [0035]) near the first end (left end, Fig. 3) in the curved portion; and

a second positioning system (second positioning system 108) added (for example, by bonding tab-shaped sheets 108a to bonded surfaces 108b at one end of a cable using adhesive or double-faced tape, paragraph [0035]) near the second end (right end, Fig. 3) in the curved portion, wherein the first positioning system (first positioning system 107) of each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) is fixed to a first positioning part (first positioning part 105) provided on or near the first object (connector 101 provided in the control part 100) (Fig. 4), the second positioning system (second positioning system 108) of each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) is fixed to a second positioning part (second positioning part 106) provided on or near the second object (connector 103 of the recording head 15) (Fig. 5), and each of the plurality of flexible cables (film cable FC1 and flexible cables FFC1 to FFCn) are spaced in the curved portion (at curve A, Fig. 2), and the second

positioning part (second positioning part 106) is provided with a guide portion (second guide part 106a and third guide part 106b) that guides the flexible cable harness (flexible cable harness 109) extending from the first positioning part (first positioning part 105) therein invariably at a specified angle (specified angle θ , FIG. 2A) relative to a direction perpendicular to a travel direction of the second object (connector 103 of the recording head 15) (paragraphs [0042] and [0044]). See also paragraphs [0035]-[0038] and [0047]-[0052] for advantages thereof.

The above reference numerals, paragraphs and figures are being used in order to provide a concise explanation of the subject matter defined in each of the independent claims involved in the Appeal. However, it should be understood that other embodiments and variations are available.

In the June 12, 2006 Amendment, which has been entered, independent claims 1 and 19 were amended to clarify that the first positioning system and the second positioning system are added near the first and second ends in order to clarify that structure is added to each of the plurality of flexible cables.

By using a plurality of flexible cables that each include the added first and second positioning systems of claims 1 and 19, manufacturing various flexible cables is simplified, production costs are reduced and positioning fluctuations are minimized (paragraphs [0035] - [0038] and [0047]-[0052], for example).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The following ground of rejection is presented for review:

1) Claims 1-6, 19 and 20 are rejected under 35 U.S.C. §103(a) over JP-U-6-21949.

Claims 7 and 8 are also rejected under 35 U.S.C. §103(a) over JP-U-6-21949 in view of U.S. Patent No. 6,257,898 to Serizawa et al. This ground of rejection is not being presented for review.

VII. ARGUMENT

The Office Action rejects claims 1-6, 19 and 20 under 35 U.S.C. §103(a) over JP-U-6-21949. The Office Action fails to give proper consideration to the factual inquiries required in determining obviousness.

A. Factual Inquiries to Determine Obviousness/Non-Obviousness

In rejecting claims under 35 U.S.C. §103, it is incumbent on the examiner to establish a factual basis to support the legal conclusion of obviousness. See, *In re Fine*, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one of ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. *Uniroyal Inc. v. F-Wiley Corp.*, 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988), *cert. denied*, 488 U.S. 825 (1988); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), *cert. denied*, 475 U.S. 1017 (1986); *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a *prima facie* case of obviousness. Note, *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

The mere fact that the prior art may be modified in the manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be suggested or taught by the prior art. *In re Royka*, 490 F.2d 981,

180 USPQ 580 (CCPA 1970). All words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

It is well settled that a rejection based on 35 U.S.C. §103 must rest on a factual basis, which the Patent and Trademark Office has the initial duty of supplying. *In re GPAC, Inc.*, 57 F.3d 1573, 1582, 35 USPQ2d 1116, 1123 (Fed. Cir. 1995). A showing of a suggestion, teaching, or motivation to combine the prior art references is an "essential evidentiary component of an obviousness holding." *C.R. Bard, Inc. v. M3 Sys. Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998). This evidence may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved. *See Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996). However, the suggestion more often comes from the teachings of the pertinent references. *See In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998). This showing must be clear and particular. Broad conclusory statements about the teaching of multiple references, standing alone, are not "evidence." *See Dembiczak*, 175 F.3d at 1000, 50 USPQ2d at 1617. However, the suggestion to combine need not be expressed and "may come from the prior art, as filtered through the knowledge of one skilled in the art." *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1472, 43 USPQ2d 1481, 1489 (Fed. Cir. 1997).

It is impermissible for an examiner to engage in hindsight reconstruction of the claimed invention using appellant's structure as a template and selecting elements from references to fill the page. The references themselves must provide some teaching whereby the appellant's combination would have been obvious. *In re Gorman*, 911 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). That is, something in the prior art as a whole must suggest the desirability, and thus obviousness, of making the combination. *See, In re Beattie*,

974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992); *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984).

**B. Claims 1-6, 19 and 20 Would Not Have Been Obvious
Over JP-U-6-21949**

Claims 1-6, 19 and 20 are rejected under 35 U.S.C. §103(a) over JP-U-6-21949 (JP '949). JP '949 fails to disclose or suggest all of the features recited in claims 1-6, 19 and 20 because JP '949 fails to suggest a first positioning system and a second positioning system that are added near the first end and the second end, respectively, of each of the plurality of flexible cables.

**1. JP '949 Does Not Teach or Suggest All
of the Features Recited in Claims 1 and 19**

a. JP '949 Simply Discloses Cables

Claims 1 and 19 call for, in pertinent part, a flexible cable harness with a plurality of flexible cables, each of the plurality of flexible cables comprising (1) a first positioning system added near the first end (each flexible cable having a first end); and (2) a second positioning system added near the second end (each flexible cable have a second end). JP '949 fails to disclose or suggest adding any structure, including any positioning system, to each of their flexible cables.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be suggested or taught by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1970). All the words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

In providing the broadest reasonable interpretation for claims 1 and 19, the flexible cable harness must have at least something (i.e., first and second positioning systems) added

to two ends of each of the plurality of flexible cables (as well as satisfy the remaining requirements of claims 1 and 19). Appellant is not claiming an image forming apparatus with a flexible cable harness in claims 1 and 19. Appellant is simply claiming a flexible cable harness. JP'949 fails to disclose or suggest anything that is added or could be added to the flexible cables (cables 13-17) of their flexible cable harness.

JP'949 discloses a flexible cable harness with cables 13-17. JP'949's figures fail to illustrate any structure that is associated with or could be added to the cables 13-17 and JP'949's specification fails to discuss any structure that is associated with or could be added to the cables 13-17. JP'949 simply discloses cables 13-17. JP'949 thus fails to disclose or suggest each of a plurality of flexible cables comprising a first positioning system added near a first end and a second positioning system added near a second end, as recited in claims 1 and 19.

In JP'949, the cables 13-17 are pressed by a cable presser-foot plate 29 at a first end and by a lateral surface of the carriage 7 at a second end, with the cables 13-17 inserted into splicers 21, 23 (paragraph [0004] of translation).

Appellant observes the following: (1) each of the presser-foot plate 29, carriage 7 and splicers 21, 23 are a part of the image forming apparatus, which the Examiner admits is a distinct combination from the sub-combination of a flexible cable harness (see December 15, 2005 Restriction Requirement), (2) it is not logical, nor would one skilled in the art state that structure from an image forming apparatus (i.e., a combination) is added to a flexible cable harness (i.e., a sub-combination), (3) if JP'949's flexible cable harness (cables 13-17) is removed from the image forming apparatus, nothing would be present at the end of the cables 13-17 and (4) JP'949's flexible cable harness (cables 13-17) does not have any structure that can achieve the advantages of simplifying the manufacturing of various flexible cables, reducing production costs and minimizing positioning fluctuations, which can be achieved by

using a plurality of flexible cables that each include the added first and second positioning systems of claims 1 and 19 (paragraphs [0036] - [0038] of Appellant's specification, for example).

JP'949 thus fails to disclose or suggest a flexible cable harness with each of a plurality of flexible cables comprising a first positioning system added near a first end and a second positioning system added near a second end, as recited in claims 1 and 19. JP'949 also fails to provide any logical reason that would have prompted one skilled in the art to add first and second positioning systems.

b. The Claims must be Given their Broadest Reasonable Interpretation Consistent with the Specification

The previous Office Actions fail to give proper consideration to the first and second positioning systems of claims 1 and 19, and the advantages that can be achieved thereof.

The pending claims must be given their broadest reasonable interpretation consistent with the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005). Appellant asserts that the previous Office Actions' interpretation of a first positioning system and a second positioning system is not a reasonable interpretation.

Page 2 of the Final Rejection identifies JP'949's "unnumbered on the cables at 29 for example" and "unnumbered on the cables at 21, 23 for example" as a first positioning system and a second positioning system. The February 6, 2007 Advisory Action further states that a system is defined as an instrumentality that combines interrelated interacting artifacts designed to work as a coherent entity. The Advisory Action further states that the first positioning system and the second positioning system at JP'949's 29 (cable presser-foot plate) and at 21, 23 (splacers) respectively meet the claim limitation as claimed.

If Appellant is to understand this argument, the Office Actions are asserting that the ends of JP '949's cables 13-17 are a first positioning system and a second positioning system

because it is the ends of JP '949's cables 13-17 that are connected to the cable presser-foot plate 29 and splicers 21, 23.

Appellant asserts that such an interpretation is not a reasonable interpretation consistent with the specification. Claims 1 and 19 call for (1) a first positioning system added near the first end (each flexible cable having a first end); and (2) a second positioning system added near the second end (each flexible cable have a second end). In providing the broadest reasonable interpretation based on just the claims alone, there must be at least some structure that is available and added to each of the flexible cables. Reviewing Appellant's specification, Appellant's description of the related art discusses using a flexible cable harness that only includes flexible cables FFC1-FFC4 (Fig. 6). Appellant notes that JP'949's flexible cable harness also only includes flexible cables 13-17 as used in Appellant's description of the related art. Appellant's detailed description of preferred embodiments discusses a flexible cables harness 109 with both flexible cables FFC1-FFCn, which are similar to the related art's flexible cables FFC1-FFC4 and JP'949's cables 13-17, and an additional first positioning system 107 and second positioning system 108. In other words, the Appellant is adding additional structure to the flexible cables that was not present in their related art or JP'949.

Appellant understands that a particular embodiment written in the detailed description may not be read into a claim. However, asserting that the ends of JP '949's cables 13-17 are a first positioning system and a second positioning system because they allegedly meet the claim limitation as claimed (as asserted in the Advisory Action) is not a reasonable interpretation consistent with the specification. It is not a reasonable interpretation when (1) both JP'949 and Appellant use similar flexible cables, (2) Appellant adds structure (i.e., first and second positioning systems) to their flexible cables when JP'949 fails to add any structure to their similar cables 13-17, and (3) Appellant's first positioning system and second

positioning system can achieve advantages when added to flexible cables (including JP '949's cables 13-17 or Appellant's flexible cables).

c. The Office Actions Fail to Point Out Where JP '949 Discloses Any Structure that is "On" the Cables

The previous Office Actions also fail to sufficiently explain why JP '949 discloses or suggests the first and second positioning systems of claims 1 and 19.

It is well settled that a rejection based on 35 U.S.C. §103 must rest on a factual basis, which the Patent and Trademark Office has the initial duty of supplying. *In re GPAC, Inc.*, 57 F.3d 1573, 1582, 35 USPQ2d 1116, 1123 (Fed. Cir. 1995). This showing must be clear and particular. Broad conclusory statements about the teaching of multiple references, standing alone, are not "evidence." See *Dembiczak*, 175 F.3d at 1000, 50 USPQ2d at 1617. Appellant asserts that the Final Rejection does not clearly point out where JP'949 discloses all of the features recited in claims 1 and 19.

Page 2 of the Final Rejection identifies "unnumbered on the cables at 29 for example" and "unnumbered on the cables at 21, 23 for example" as a first positioning system and a second positioning system. JP'949 fails to disclose any structure or positioning system that is "on" the cables 13-17 at 21, 23, and 29 as asserted in the Final Rejection that can be added to each of a plurality of flexible cables as recited in claims 1 and 19. Furthermore, the February 6, 2006 Advisory Action fails to clarify this issue by stating that a first positioning system and a second positioning system are "at" 21, 23 and 29.

Appellant cannot determine what the Examiner considers to be "on" or "at" the cables 13-17 because JP'949 simply discloses cables 13-17 attached to a cable presser-foot plate 29 and splicers 21, 23 of an image forming apparatus. Appellant thus cannot reasonably determine what the Examiner considers to be the first and second positioning systems that are added (as recited in claims 1 and 19) to each of JP'949's cables 13-17.

It would not have been obvious, nor is there any reason, to add structure that does not exist. By failing to disclose any structure (i.e., first and second positioning systems of claims 1 and 19) that is "on" the cables 13-17 or could be added to the cables 13-17, JP'949 thus fails to disclose or suggest each of a plurality of flexible cables comprising a first positioning system added near a first end and a second positioning system added near a second end, as recited in claims 1 and 19.

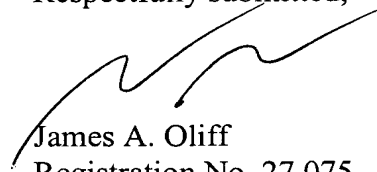
2. Conclusion

As discussed above, the subject matter of claims 1-6, 19 and 20 would not have been rendered obvious by the cited reference. For the above reasons, Appellant respectfully requests that the rejection be reversed.

VIII. CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1-15, 19 and 20 are in condition for allowance. For all of the above reasons, Appellant respectfully requests this Honorable Board to reverse the rejections of claims 1-8, 19 and 20.

Respectfully submitted,



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APPENDIX A - CLAIMS APPENDIX

CLAIMS INVOLVED IN THE APPEAL:

1. A flexible cable harness, comprising:
a plurality of flexible cables, each having a first end connected to a first object and a second end connected to a second object, at least one of the plurality of flexible cables contributing to an electrical connection between the first object and the second object,
each of the plurality of flexible cables comprising:
a curved portion that curves between the first end and the second end;
a first positioning system added near the first end in the curved portion;
and
a second positioning system added near the second end in the curved portion, wherein a distance from the first positioning system to the second positioning system is different in each of the plurality of flexible cables such that more inward flexible cables located at the curved portion are shorter in distance between the first positioning system and the second positioning system, the first positioning system of each of the plurality of flexible cables is fixed to a first positioning part provided on or near the first object, the second positioning system of each of the plurality of flexible cables is fixed to a second positioning part provided on or near the second object, and each of the plurality of flexible cables are spaced in the curved portion.
2. The flexible cable harness according to claim 1, wherein the first object is a fixed member, the second object is a movable member, the first positioning system of each of the plurality of flexible cables is fixed to the first positioning part provided fixedly with the fixed member, and the second positioning system of each of the plurality of flexible cables is

provided on or near the movable member and fixed to the second positioning part movable with the movable member.

3. The flexible cable harness according to claim 1, wherein the distance from the first positioning system to the second positioning system is set in each of the plurality of flexible cables such that a curvature radius of the curved portion is reduced by a specified amount as the flexible cables are located more inward at the curved portion.

4. The flexible cable harness according to claim 1, wherein the first positioning system and the second positioning system are integral with each of the plurality of flexible cables.

5. The flexible cable harness according to claim 1, wherein the first positioning system and the second positioning system are separate pieces and added to each of the plurality of flexible cables.

6. The flexible cable harness according to claim 1, wherein the flexible cables are set in position by engagement of the first positioning system with the first engagement part and the second positioning system with the second engagement part.

7. The flexible cable harness according to claim 1, wherein each of the first positioning system and the second positioning system is provided on a shorter side of each of the plurality of flexible cables, and includes a hole provided beyond a width of each of the plurality of flexible cables, the hole is engaged with a corresponding protrusion provided on each of the first positioning part and the second positioning part in order to set the cables in place.

8. The flexible cable harness according to claim 1, wherein each of the first positioning system and the second positioning system include two holes spaced from each other, and each of the first positioning part and the second positioning part includes two protrusions corresponding to the two holes.

9. An image forming apparatus including the flexible cable harness according to claim 2, wherein the fixed member is a control circuit board fixed to a frame, the movable member is a carriage mounting a recording head thereon, and the flexible cable harness is connected to the control circuit board on the first end and the carriage on the second end.

10. The image forming apparatus according to claim 9, wherein the frame includes left and right side plates supporting a guide shaft that guides the carriage in a movable direction and a rear frame provided between the left and right side plates, and the carriage has a substantially box shape and two sides for positioning the recording head, the first positioning part is disposed at a substantially central portion of the rear frame with respect to a left to right direction thereof, and the second positioning part is disposed on one of the two sides of the carriage.

11. The image forming apparatus according to claim 10, wherein the first positioning part and the second positioning part include protrusions engageable with the holes of the first positioning system and the second positioning system and lids that cover and fix the first positioning system and the second positioning system respectively.

12. The image forming apparatus according to claim 10, wherein the second positioning part is provided with a guide portion that guides the flexible cable harness extending from the first positioning part therein invariably at a specified angle relative to a direction perpendicular to a travel direction of the carriage.

13. The image forming apparatus according to claim 12, wherein the guide portion includes a pair of guide members to pinch and guide the flexible cable harness from both sides thereof.

14. The image forming apparatus according to claim 12, wherein the specified angle is from 35° to 60°.

15. The image forming apparatus according to claim 1, wherein the plurality of flexible cables are tied in a bundle.

19. A flexible cable harness, comprising:
a plurality of flexible cables, each having a first end connected to a first object and a second end connected to a moveable second object, at least one of the plurality of flexible cables contributing to an electrical connection between the first object and the second object,

each of the plurality of flexible cables comprising:

a curved portion that curves between the first end and the second end;
a first positioning system added near the first end in the curved portion;

and

a second positioning system added near the second end in the curved portion, wherein the first positioning system of each of the plurality of flexible cables is fixed to a first positioning part provided on or near the first object, the second positioning system of each of the plurality of flexible cables is fixed to a second positioning part provided on or near the second object, and the second positioning part is provided with a guide portion that guides the flexible cable harness extending from the first positioning part therein invariably at a specified angle relative to a direction perpendicular to a travel direction of the second object.

20. The flexible cable harness according to claim 19, wherein a distance from the first positioning system to the second positioning system is different in each of the plurality of flexible cables such that more inward flexible cables located at the curved portion are shorter in distance between the first positioning system and the second positioning system and each of the plurality of flexible cables are spaced in the curved portion.

APPENDIX B - EVIDENCE APPENDIX

NONE

APPENDIX C - RELATED PROCEEDINGS APPENDIX

NONE